Translation

PCT/DE2003/002274

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2002P11264WO	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/DE2003/002274	International filing date (*day/month/year*) 07 July 2003 (07.07.2003)	Priority date (*day/month/year*) 15 July 2002 (15.07.2002)
International Patent Classification (IPC) or national classification and IPC G06F 17/21		
Applicant SIEMENS AKTIENGESELLSCHAFT		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 6 sheets, as follows:

      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

   ☒ Box No. I Basis of the report
   ☐ Box No. II Priority
   ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   ☐ Box No. IV Lack of unity of invention
   ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   ☐ Box No. VI Certain documents cited
   ☐ Box No. VII Certain defects in the international application
   ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 08 January 2004 (08.01.2004)	Date of completion of this report 22 November 2004 (22.11.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/DE2003/002274

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☒ The international application as originally filed/furnished

☒ the description:

pages 1-14, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____, as originally filed/furnished

pages* _____, as amended (together with any statement) under Article 19

pages* 1-14 received by this Authority on 13 September 2004 (13.09.2004)

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1/2-2/2, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRE[redacted]INARY EXAMINATION REPORT

International application No.
PC[redacted]/DE 03/02274

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-14	YES
	Claims		NO
Inventive step (IS)	Claims	1-14	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-14	YES
	Claims		NO

2. Citations and explanations

1. Reference is made to the following documents:

D1: FR2813743 (SEYRAT CLAUDE) 8 March 2002

D2: XP001001465 (SEYRAT ET AL) March 2001.

2.1 Document D1 is considered to be the prior art closest to the subject matter of claims 1-14. Said document discloses (the references between parentheses relate to D1):

a method for encoding and transmitting an XML document (abstract; page 1, lines 26-35),

said method comprising the following steps:

a) normalising the XML schema associated with the XML document (page 9, lines 23-38; figure 1);

b) coding the normalised XML schema, using a metaschema (page 3, lines 10-14);

c) transmitting the coded XML schema in a first bitstream (page 3, line 34 to page 4, line 3);

d) coding the XML document, using the associated XML schema (page 3, lines 15-19);

/...

e) transmitting the coded XML document in a second bitstream, the first and second bitstream for receiving being provided for a decoder (page 3, line 34 to page 4, line 3)

that carries out the following steps:

f) decoding the coded XML schemas transmitted in the first bitstream into the normalised XML schema, using the metaschema, wherein the normalised schema and the metaschema correspond to the schema used in the coding step (page 4, lines 5-24).

Thus, the subject matter of claim 1 differs from the known document, document D1, in that:

the normalisation of the XML schema in D1 does not include the following steps:

- simplifying a group that contains only one element:

  the group is resolved and the element contained therein is incorporated into the content model on the level of the resolved group, the attributes "min" and "maxOccurs" of said element being replaced by the product of the corresponding attributes of the resolved group and the element before said regrouping;

- simplifying a choice group that contains one element having the attribute value "minOccurs=0":

  the attribute "minOccurs" of the choice group is set to zero regardless of the preceding

/...

value, an attribute value minOccurs being assigned to the element which had the attribute value "minOccurs=0";

- simplifying nested choice groups:

  if a choice group contains another choice group that contains the attribute values "minOccurs=maxOccurs", then

  the latter choice group is resolved and its contents are directly incorporated into the hierarchically superior choice group; the above terms, namely "group", "element", "content model", "attribute", "minOccurs", "maxOccurs" and "choice group", are defined in the normative description of the XML schema language;

  and:

g) decoding the coded XML document transmitted in the second bitstream using the normalised XML schema, without carrying out any further normalisation of the normalised XML schema.

The subject matter of claim 1 is therefore novel (PCT Article 33(2)).

The problem addressed by the present invention can consequently be regarded as that of providing a more specific normalisation and dispensing with a second normalisation.

The solution to this problem, as proposed in claim 1 of the present application involves an inventive step (PCT Article 33(3)), the reasons being the following:

The individual normalisation steps are described, as a result of which coding efficiency is increased and the decoder payload reduced. Moreover, the decoder payload is additionally reduced since further normalisation is never required in step g) whereas, in D1, only in random instances is further normalisation unnecessary.

Claims 2-5 are dependent on claim 1 and therefore likewise satisfy the requirements of the PCT in respect of novelty and inventive step.

2.2 The subject matter of claim 6 discloses a method for decoding a first and second bitstream using the same techniques as those according to the method of D1. The subject matter of claim 6 and claims 7-10, which are dependent on claim 1, consequently satisfies the requirements of the PCT in respect of novelty and inventive step.

2.3 The subject matter of claim 11 discloses a device for encoding XML documents, said device comprising a decoding unit which is configured in such a way that it carries out an encoding method as per one of claims 1-5. The subject matter of claim 11 and of claim 13, which claim is dependent on claim 11, therefore satisfies the requirements of the PCT in respect of novelty and inventive step.

2.4 The subject matter of claim 12 discloses a device for decoding XML documents, said device comprising a decoding unit which is configured in such a way that it carries out a decoding method according to one of

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claims 6-10. The subject matter of claim 12 and of claim 14, which claim is dependent on claim 12, therefore satisfies the requirements of the PCT in respect of novelty and inventive step.

3.1 The features of the claims are not followed by reference signs placed between parentheses (PCT Rule 6.2(b)).

3.2 Contrary to PCT Rule 5.1(a)(ii), the description does not cite documents D1 and D2 or indicate the relevant prior art disclosed therein.

Claims

1. Method for encoding and transmitting an XML document, with the following steps:

a) Normalization of the XML schema associated with the XML document, where the normalization of the XML schema comprises one of the following steps:

- Simplification of a group which contains only one element: the group is dissolved and the contained element is put into the content model at the level of the dissolved group, where the attributes minOccurs and maxOccurs of the element are replaced by the product of the corresponding attributes of the dissolved group and the element prior to the regrouping;
- Simplification of a choice group containing an element with the attribute value minOccurs=0: the attribute minOccurs of the choice group is set to 0 irrespective of the previous value, while the element which had an attribute value minOccurs=0 is assigned an attribute value minOccurs=1;
- Simplification of nested choice groups: if a choice group contains another choice group which contains the attribute values minOccurs=maxOccurs=1, that choice group is dissolved and the contents are incorporated directly into the superordinate choice group;

where the terms group, element, content model, attribute, minOccurs, maxOccurs and choice group are defined in the normative description of the XML schema language;

b) Encoding of the normalized XML schema with the aid of a metaschema;

c) Transmission of the encoded XML schema in a first bit stream;

d) Encoding of the XML document by using the associated XML schema;

e) Transmission of the encoded XML document in a second bit stream;

where the first and second bit streams are provided for the purposes of reception for a decoder which carries out the following steps:

f) Decoding of the encoded XML schema transmitted in the first bit stream into the normalized XML schema by using the metaschema,

where the normalized schema and the metaschema correspond to the schemas used in the encoding;

g) Decoding of the encoded XML document transmitted in the second bit stream by using the normalized XML schema, without performing a further normalization of the normalized XML schema.

2. Method according to Claim 1,
in which element declarations and/or attribute declarations of the schema definition of a structured document are restructured in such a way that anonymous type definitions (AT0) are taken out of the element declarations and/or attribute declarations and are given a name and/or code which is used for referencing purposes in the case of the corresponding element.

3. Method according to Claim 1 or 2,
in which, in place of type names and/or element names and/or names of substitution groups, only numbers and also one or more tables containing an allocation between numbers and type names and/or element names and/or names of substitution groups are encoded.

4. Method according to one of Claims 1 to 3,
in which one or more lists comprising the type names and/or element names and/or names of substitution groups and also the positions of the type names and/or element names and/or names of substitution groups in the list are encoded in place of type names and/or element names and/or names of substitution groups.

5. Method according to one of the preceding claims,
in which information for the inheritance tree of types, global elements and/or substitution groups is encoded,
where each type is described by an item of information about its type code with reference to the master type and the length of all type codes which refer to the type described
and/or each global element is described by the length of the SBC and an SBC and/or each element in a substitution group by the length of the substitution codes and a substitution code.

6. Method for decoding a first and second bit stream which have been produced from an XML document with the aid of an encoding method, where the encoding method comprises the following steps:

a) Normalization of the XML schema associated with the XML document, where the normalization of the XML schema comprises one of the following steps:

- Simplification of a group which contains only one element:
  the group is dissolved and the contained element is put into the content model at the level of the dissolved group, where the attributes minOccurs and maxOccurs of the element are replaced by the product of the corresponding attributes of the dissolved group and the element prior to the regrouping;
- Simplification of a choice group containing an element with the attribute value minOccurs=0:
  the attribute minOccurs of the choice group is set to 0 irrespective of the previous value, while the element which had an attribute value minOccurs=0 is assigned an attribute value minOccurs=1;
- Simplification of nested choice groups:
  if a choice group contains another choice group which contains the attribute values minOccurs=maxOccurs=1, that choice group is dissolved and the contents are incorporated directly into the superordinate choice group;

where the terms group, element, content model, attribute, minOccurs, maxOccurs and choice group are defined in the normative description of the XML schema language;

b) Encoding of the normalized XML schema with the aid of a metaschema;

c) Transmission of the encoded XML schema in a first bit stream;

d) Encoding of the XML document by using the associated XML schema;

e) Transmission of the encoded XML document in a second bit stream;

where the following steps are carried out in the decoding method:

f) Decoding of the encoded XML schema transmitted in the first bit stream into the normalized XML schema by using the metaschema, where the normalized schema and the metaschema correspond to the schemas used in the encoding;

g) Decoding of the encoded XML document transmitted in the second bit stream by using the normalized XML schema, without performing a further normalization of the normalized XML schema.

7. Method according to Claim 6,
in which element declarations and/or attribute declarations of a structured document are restructured in such a way that anonymous types (AT0), to which a name and/or code has been assigned for the purposes of transmission, are inserted in the respective element declaration or attribute declaration by which the respective anonymous type is referenced.

8. Method according to Claims 6 or 7,
in which type names and/or element names and/or names of substitution groups are decoded from the bit stream via numbers and also one or more tables containing an allocation between numbers and type names and/or element names and/or names of substitution groups.

9. Method according to one of Claims 6 to 8,
in which type names and/or element names and/or names of substitution groups are decoded from the bit stream via one or more lists comprising the type names and/or element names and/or names of

substitution groups and also the positions of the type names and/or element names and/or names of substitution groups in the list.

10. Method according to one of Claims 6 to 9,
in which information for an inheritance tree of types and/or global elements and/or substitution groups is first decoded from the bit stream, where each type is described by an item of information about its type code with reference to the master type and the length of all type codes which refer to the type described,
and/or each global element is described by the length of the SBC and an SBC and/or each element in a substitution group by the length of the substitution codes and a substitution code.

11. Device for encoding XML documents,
in which an encoder unit is present which is adapted in such a way that it carries out an encoding method according to one of Claims 1 to 5.

12. Device for decoding XML documents,
in which a decoder unit is present which is adapted in such a way that it carries out a decoding method according to one of Claims 6 to 10.

13. Device according to Claim 11,
in which the encoder unit displays a configurable byte code interpreter which interprets information in a byte code and which, depending on the configuration, produces a code from the structured document based on a byte code, which represents a path or a payload.

14. Device according to Claim 12,
in which the decoder unit displays a configurable byte code interpreter which is configurable by means of information from the bit stream and which, depending on the configuration, produces a path, payload or byte code from the bit stream based on a byte code.